

What is claimed:

1. A nano-twin copper material with ultrahigh strength and high electrical conductivity was composed of roughly equiaxed submicron-sized grains, inside each grain, there are high density of growth-in twin lamellae with different orientations; and the twin lamellae with the same orientations are inter-parallel; The twin spacing ranges from several nanometers to 100 nm; and the lengths from 100-500 nm.
2. The nano-twin copper material with ultrahigh strength and high electrical conductivity according to the claim 1, characterized in that it has the following properties: density of $8.93 \pm 0.03 \text{ g/cm}^3$, purity of $99.997 \pm 0.02 \text{ at\%}$, yield strength of $900 \pm 10 \text{ MPa}$ and elongation of $13.5 \pm 0.5\%$ at room temperature at tensile strain rate of $6 \times 10^{-3}/\text{s}$, electrical resistivity at room temperature (293 K) of $(1.75 \pm 0.02) \times 10^{-8} \Omega \cdot \text{m}$, the temperature coefficient of resistivity of $6.78 \times 10^{-11} \text{ K}^{-1}$.
3. The nano-twin copper material with ultrahigh strength and high electrical conductivity according to the claim 1, characterized in that the said submicron grain sizes range from 300-1000 nm.
4. A method for producing a nano-twin copper material with ultrahigh strength and high electrical conductivity according to the claim 1, characterized in that the electrodeposition technique is used, electron purity grade CuSO_4 solution is selected as electrolyte with the addition of ion-exchanged water or distilled water, pH of the said electrolyte is 0.5-1.5, anode is 99.99% pure Cu sheet and cathode is iron sheet or low carbon steel sheet with surface plated by Ni-P amorphous layer;

The said pulsed electrodeposition technique parameters comprise: pulse current density of $40 \sim 100 \text{ A/cm}^2$; on-time (t_{on}) of $0.01 \sim 0.05 \text{ s}$ and off-time (t_{off}) of $1 \sim 3 \text{ s}$; the distance between anode and cathode of $50 \sim 100 \text{ mm}$, the area ratio of anode and cathode of $(30 \sim 50):1$; electrolyte temperature of $15 \sim 30^\circ \text{C}$; electrolyte in electromagnetic stirring;

Additive is a combination of 0.02-0.2 mL/L gelatine aqueous solution with concentration of 5-25% and 0.2-1.0 mL/L high-purity NaCl aqueous solution with concentration of 5-25%.